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SEPTEMBER 16, 1950

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Enemies at Peace

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A SCIENCE SERVICE PUBLICATION

$5.00 A YEAR

VOL. 58 NO. 12 PAGES 177-192

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BIOLOGY

From Now On: Cells

Rapidly dividing cells, which hold the secret spark of life, are still the top mystery of science. This secret may be broken in the research of tomorrow.

By WATSON DAVIS

This is the last in a series of glances forward into science.

➤ THE primary mystery of the world is still that of life and death. No longer do any bold scientists have confidence that what we now know about purely mechanistic physics and chemistry, applied biology, will explain the spark of life and the fundamental difference between the living and the non-living.

Death, particularly, is the motive power behind all religions and many philosophies. The eternal questions seem to be what is life, what was the origin of consciousness, organized growth, and the ability to reproduce one's kind. What is the future of life as we know it?

We are not sure how life originated on the earth. Did it arise out of slimes of seas a couple of billion years ago, warmed by the sun of early eons? Has it arisen more than once in the history of the earth? Is there a chance that in primitive form life comes into being in our own time?

The viruses consisting of complex and relatively gigantic protein molecules have some of the attributes of living matter. They reproduce themselves and yet they are not, presumably, alive.

Biologists have explored into living cells and tried to put the searching fingers of their intellects upon the vital substances. Within the germ cell there is a nucleus. Within this spherical body there are chromosomes, units that carry on the heredity of life. Within the chromosomes there are genes which determine the shape and whole structure of the living thing starting its marvelous new life.

And all of these persistent and highly specific parts of the cell are made up of atoms and molecules, the same kind of atoms and molecules that compose the non-living rocks and walls and other things of everyday life.

There is one significant difference between the composition of the living and the non-living, that is, in the way in which the atoms and the molecules they form are arranged. Dr. Erwin Schroedinger, Nobelist, among the many who have pondered this mystery of life, believes the secret lies in the atomic arrangement and the structure of the fundamental elements.

Somewhat as there seem to be two physical laws, one governing what happens within the nucleus of the atom, and the other governing everything else in the universe, so the living organism seems to have a different sort of thermodynamics than inorganic matter which allows it to concentrate and build in an orderly manner instead of dissipating chaotically.

A half century ago there was high confidence in some quarters that the physical scientist could, by extending his laws, explain life. Today the problem is not so simple.

For the future:

A. All the basic research upon chemicals, living organisms, disease and everything else within the realm of scientific investigation, including the development of mathematics, will be used for hints that may be useful in solving this mystery of life.

B. In the studies upon the viruses and related protein complexes, there may come an opportunity with more progress and knowledge to aspire again to attempt the creation of living from non-living matter.

C. Even the millions upon millions of galaxies of stars, remote as they are from the minute vigor of an embryo, may give their hints upon understanding the nature and meaning of life.

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GENERAL SCIENCE

USSR Physicist Rebuked

➤ THE Russians have slapped down their top theoretical physicist for being a "spreader of idealistic assertions" who has a "negative attitude toward dialectical materialism and in his writings sometimes acted as a loud-speaker for the opinions of bourgeois physicists." This latest victim of the "Marxist-Leninist theory" is Dr. J. Frenkel, recognized as a top man in theoretical physics and quantum mechanics.

Dr. Frenkel's work could conceivably have been in connection with the development of the Russian A-bomb, although American physicists who know and admire his theoretical work decline to hazard a guess as to that.

According to a speech by a Prof. D. N. Nasledov, of the USSR Academy of Sciences, printed in the Leningrad PRAVDA and reprinted in the American PHYSICS TODAY, Dr. Frenkel "admitted his ideological errors and in his declaration stated that he had come to the conclusion that the Marxist-Leninist theory in the natural sciences and particularly, in the science of physics, is of foremost importance."

This sort of thing is not new to Dr. Frenkel. In the 1920's, during a popular lecture in Russia, he repeated the current joke among physicists about electrons. "On Mondays, Wednesdays and Fridays," he said, "physicists believe electrons are waves, on Tuesdays, Thursdays and Saturdays, they think electrons are particles of matter."

Whereupon a handsome young female communist in the audience rose from her chair and berated Comrade Frenkel. "This sort of bourgeois compromise," she stated, "cannot exist alongside dialectic materialism." After that, things being more lenient in Russia in those days, Dr. Frenkel went into voluntary exile for a few years.

There is evidence in this most recent speech, as printed in the Leningrad PRAVDA, that the Russians are trying to cook up an argument in physics similar to the argument in biology which produced Lysenko.

"Creative brigades have been formed," said Prof. Nasledov, "which have been busy stuying the two basic fields of modern physics (quantum mechanics and the theory of relativity) with regard to which bourgeois critics have uttered so much idealistic nonsense."

Prof. Nasledov expresses the hope that out of these "creative brigades" will come papers directed against these "bourgeois perversions."

American physicists cannot imagine what hook the Russian physicists will find on which to pin an argument with the Western world. Nor do Western scientists think that such goings-on will affect too much the actual quality of the work the Russian physicists are doing, except insofar as their time is wasted in attending meetings of "creative brigades." There is no evidence yet, in papers published by Russian physicists, that dialectic materialism has crept into their work to its detriment.

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MEDICINE

Army Gets X-rays At Wholesale Rate

➤ UNCLE Sam is getting the draft X-ray and blood tests at a fair wholesale rate, although doctors do admit that bulk of gross business that some practitioners and hospitals are getting is very nice for them indeed. In Washington the workmen's compensation schedule followed by doctors in insurance cases allows $5 to $35 per X-ray instead of the $3 fee approved by the army for the X-ray alone. Blood tests for syphilis (Wassermann and Kahn) are rated at $5 instead of the army rate of $2.

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MEDICINE

Clue to Virus Origin

By a yet unknown process the polio virus reduplicates itself in the nuclei of the cells of the human body. The virus was heretofore thought to exist only in the cytoplasm.

➤ A NEW chemical attack on polio has given scientists at Yale University in New Haven, Conn., a working theory of the origin of the virus and clues to the problem of immunity and resistance to it.

The polio virus, according to this theory, is manufactured by cells of the human body, with the first virus that invades the body serving as a template. But whether the virus reduplicates itself or is made by the cells of human spinal cords, the manufacturing process goes on in the nucleus of the cells.

Findings supporting this new approach to the polio problem were announced by Drs. Joseph L. Melnick and John B. LeRoy of Yale University School of Medicine at the Congress of the International Society for Cell Biology in New Haven, Conn.

Scientists heretofore have thought the polio virus existed only in the part of the cell called the cytoplasm, which is the fluid that bathes the nucleus. Finding it in the nucleus may explain, for example, why a person who had polio at the age of two might still have antibodies to the virus in his body at the age of 70 years. Small amounts of the virus may have been locked away in the cell nucleus all the time, giving rise to the antibodies.

How the virus attacks and ultimately causes the breakdown of cells in the spinal cord, the part of the body most severely affected during polio, could also be explained by the new theory. Within the nucleus is a particle called the nucleolus. The virus may make enormous demands on the manufacturing process in this nucleolus which eventually result in the complete breakdown of the cell structure.

Finding the polio virus in the nucleus of the cells also gives "new light" on the relationship of fatigue to polio.

Many parents as well as doctors know that being over-tired at the time polio attacks makes the victim more liable to paralysis. The proteins of the cell nucleus, Swedish scientists have found, are consumed rapidly after a period of fatigue and are re-formed at a much slower rate.

"It would seem," Dr. Melnick said, "that the less fatigue an infected individual is subjected to, the greater would be the chances of maintaining adequate supplies of cellular nucleoprotein and preventing the onset of paralysis."

Nucleoprotein, one of the materials essential to all life in the structure of cells, has an earthworm-like appearance when seen via electron microscope photographs.

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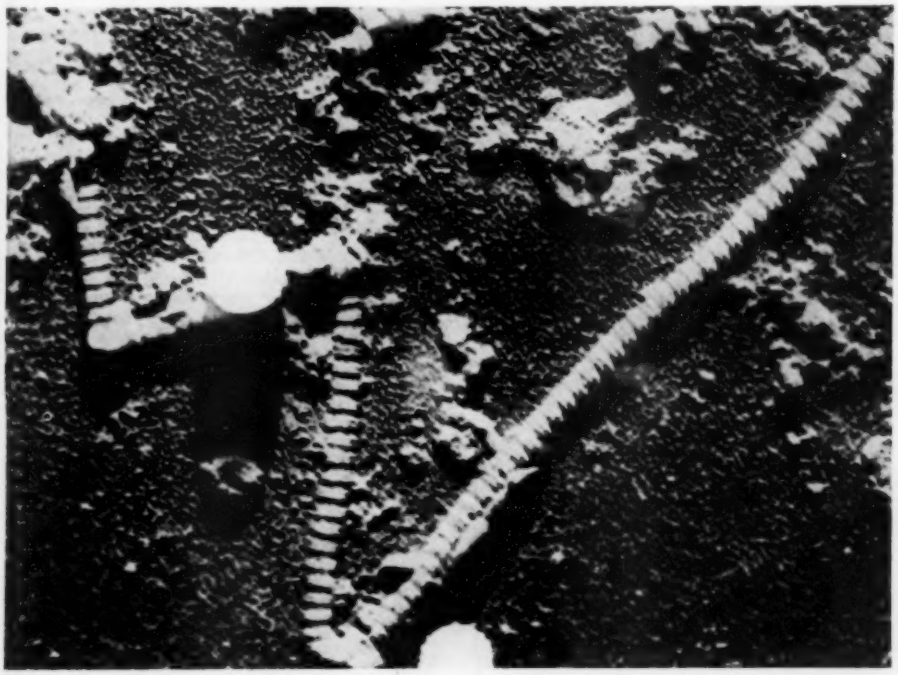

NUCLEOPROTEIN "EARTHWORM"—The electron microscope photograph shows a section of a nucleoprotein thread, indispensable substance of life, from cells in the spinal cord. Nucleoproteins are also found in viruses. The "earthworm" segments measure two millionths of an inch in length, and the white balls are signposts of artificial rubber which are added to the preparation for purposes of measurement.

CHEMISTRY

Electrical Attraction Is First Virus Attack Step

➤ A THEORY that electrical attraction governs the first step in the attack of disease-causing viruses on body cells was reported to the American Chemical Society meeting, Chicago, Ill.

Blocking this attraction would be the way to give immunity to the virus, according to this theory.

The blocking is possible, laboratory experiments confirmed by radioactive tracer studies show, Prof. Theodore T. Puck of the University of Colorado Medical Center, Denver, finds.

Viruses are the causes of a wide range of diseases from poliomyelitis to the common cold. Prof. Puck's studies were made with a virus that does not cause human disease but is representative of viruses in general and is suitable for laboratory experiments.

The virus attacks the cell by a two-step process, Prof. Puck found. In the first step, attachment to the cell results from a purely electrical attachment governed by charged metallic atoms, or ions, normally present in the cell's environment. Introducing certain other metallic ions, not ordinarily present, blocks this attraction.

In the second phase of the attack, the virus becomes a part of the cell. This step cannot be reversed. The length of the period between the first and second steps, during which the ionic counter-attack must be made, is not yet known.

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BIOLOGY

Previral Units Are Forerunners of Virus

➤ A NEW theory of how disease-causing viruses multiply within the cells of the body was announced by Drs. Geoffrey Rake and Harvey Blank of the Squibb Institute for Medical Research, New Brunswick, N. J., and the University of Pennsylvania and Children's Hospital, Philadelphia, at the Fifth International Congress for Microbiology in Rio De Janeiro, Brazil.

In the early stages of virus multiplication, according to the new theory, there are "previral units." These are smaller than

the fully formed virus particles with which scientists have previously been familiar.

The fully formed virus particles seem to be made up of a number of previral units around which a matrix of other material forms.

This picture of how viruses multiply within the cell was developed from studies with the virus of *molluscum contagiosum*. This is a skin disease affecting only the superficial layers of the skin. The virus producing it has characteristics placing it in the group of pox viruses which produce such diseases as smallpox, chickenpox and, in animals, cowpox. The surface skin lumps produced by this virus develop slowly and are benign in nature. This makes it easy to obtain large amounts of material for examination.

New and delicate methods of tissue stainings were applied to the infected cells and fragments of cells affected by this virus. They were then examined under the electron microscope. From these studies came the new theory of virus multiplication. It is considered of great theoretical importance because heretofore very little has been known about the early stages of the multiplication of viruses inside cells, with the exception of bacteriophages, which are viruses that prey on bacteria.

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AERONAUTICS

Private Planes in War

➤ THE part that American private planes can play in total or partial war emergencies is outlined in a special report just made to the U. S. Civil Aeronautics Administration by a committee of 12 experienced airmen.

This nation's non-scheduled aviation industry is an irreplaceable reservoir of talent and equipment of tremendous potential value in the defense of the United States, the report states. There are more than 60,000 active aircraft, almost one-half million trained pilots and some 5,000 operating non-military airports in the United States.

These rich civil aviation resources of the nation must be preserved and encouraged so that they will be available to military and civilian defense agencies as the need arises, the committee declares. The majority of airmen accepts the principle that internal security is the most important consideration involved in all flight operations and that certain steps should be taken immediately to guarantee that security.

During a period of active air defense there are two particular problems of military concern. The first is the positive identification of all aircraft operating within "sensitive" military areas. The second is the prevention of unauthorized use of civil aircraft for purposes of sabotage or espionage.

Sensitive military areas are those where a continuous watch by radar tracking and ground observation is maintained. To prevent sabotage or espionage, satisfactory controls covering security clearance of airmen, operational controls and identification of aircraft are essential.

Among various suggestions made by the committee is the installation of equipment on aircraft so that air-to-ground communications on very high frequency channels may be maintained. It is also recommended that all pilots carry an identification card containing fingerprints, photograph, full name, signature and personal description.

Registration with a State Defense Council or "control airport" should be required for all aircraft, the report states. All pilots should, if possible, file flight plans. Some of the recommendations will be implemented at once, D. W. Rentzel, the head of CAA, announces.

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Question Box

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INVENTION

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MEDICINE

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Photographs: Cover, Tulane Photo Service; p. 179, Joseph L. Melnick and John B. LeRoy; p. 181, Macmillan Company; p. 182, Reynolds Metals Company; p. 183, Tulane Photo Service; p. 192, Union Carbide and Carbon Corporation.

● RADIO

Saturday, September 23, 3:15-3:30 p.m. EDST

"Adventures in Science" with Watson Davis, director of Science Service over Columbia Broadcasting System.

Mr. Davis will discuss "The First National Science Fair" with educators and finalists.

SCIENCE NEWS LETTER
VOL. 58 SEPTEMBER 16, 1950 No. 12

44,400 copies of this issue printed

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W. Washington 6, D. C., NOrth 2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., $5.50; 2 yrs., $10.00; 3 yrs., $14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

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Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C. under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 34.40, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925; 39 U. S. Code 283), authorized February 28, 1950. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., PEnnsylvania 6-5566 and 360 N. Michigan Ave., Chicago. STAte 4439.

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PSYCHOLOGY

Sculpture Aids Blind

Orientation depends upon putting individual impressions together to form a meaningful whole. The art of the blind falls into either the visual or haptic types.

➤ BLIND people can be helped to find their way around by teaching them sculpture, Prof. Viktor Lowenfeld of Pennsylvania State College told the American Psychological Association in State College, Pa.

Orientation in seeing persons as well as in the blind depends, he explained, on the ability to put fragmentary impressions together to form a meaningful whole.

If you get lost as you make repeated turns in a strange city, it is because you do not retain the impression of all your various turns long enough to get a visualization or mental map of your travels.

Prof. Lowenfeld's findings come from a five-year study of the art of the blind.

When a blind artist works on modeling a head, he does not work with the head facing him as a seeing artist does. He stands behind the statue and reaches around it to model the features.

The majority of the blind do not begin, as does the seeing artist, with a single lump of clay and work it to form the various features. Instead they begin with separate parts for chin, mouth, nose, forehead and so on, and put them together without trying particularly to make them into a realistic or coherent whole.

In fact, the size of a single feature, such as the eyes, may be exaggerated with its importance to the artist. The hands of a violin player may be shown as enormous.

Most children's art is like that of this type of blind artist. Expressionism may also belong to this same type.

This type of blind artist is not concerned with the appearance of the world; he gives expression to his body feelings and his emotions rather than attempting to copy what he discerns with his touch or other senses.

Inside the mouth he will model the tongue, teeth and even the tonsils, because he knows they are there, although they are hidden by the closed mouth in the finished statue.

Other blind artists work like those with sight. They start with a single lump of clay representing the head and then form in it a cavity for the mouth, a nose, forehead, eye sockets and eyes, lids, eyebrows and wrinkles. Although they cannot see, Prof. Lowenfeld calls these the "visual" type because they work as do seeing artists.

The "haptic" type, representing about 65% of blind artists, begins with a part and not with a whole lump and often leaves a hole in the top of the head as it is formed so as to push out the eyeballs from the inside.

Prof. Lowenfeld's study of the art of the blind led to his tracing the development of art imagery. When the individual, whether blind or seeing, first begins to express himself through art, he produces a vague total form without accurate details. The crude drawings of the cavemen were of that type.

In the second stage of deveolpment, the artist becomes aware of details and out of his urge to formulate them, makes his drawings or sculpture with geometric precision.

Later still he graduates from this stage and develops his freedom from mere duplication of observed objects and is able to express his emotional relation to the observed world. From this stage are developed the various schools of art.

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GENERAL SCIENCE

More Flying Saucers

➤ YOU can expect another rash of flying saucer reports during the next couple of months. A new book about the mysterious objects will probably induce people to work up an interest again, and some of them will be seeing things in the sky.

This latest book, BEHIND THE FLYING SAUCERS, by Frank Scully (Henry Holt and Company) tops them all. Mr. Scully's previous books bear such scientific titles as FUN IN BED, MORE FUN IN BED, JUNIOR FUN IN BED, and JUST WHAT THE DOCTOR ORDERED. In his saucer book, he quotes a mysterious and very anonymous "Dr. Gee" as saying he got right up close to four of the saucers. One of them, this nameless "Dr. Gee" is quoted as saying, flew away before he and his party could grab it.

Mr. Scully met his mysterious "Dr. Gee" through Silas Mason Newton, of Denver, Colo., an oil man who believes not only in flying saucers but also in an unconventional method of finding oil.

Mainly on the authority of this "Dr. Gee," Mr. Scully tells a fantastic science fiction tale about hundreds of flying saucers

ART OF BLIND—The distorted figure of the wood-chopper depicts the sculpture of the blind in which the individual parts of the figure are fashioned with little attention to the figure as a whole. The face which portrays pain is an example of the visual type in which the facial features are considered a part of an integral whole.

from Venus made of a strange new metal. He says the little men who make up their crews have been casing this old world for many years. He claims that "magnetic experts," again nameless, believe they fly to the earth on magnetic waves of force which enable them to travel at greater than the speed of light. He claims that the Air Force spirited away three of these flying saucers that actually landed here, together with the bodies of 34 little men, 36 to 42 inches high. He tells all this with a straight face, evidently believing his shy "Dr. Gee."

Mr. Scully tackles Albert Einstein and all other reputable physicists who believe that nothing can travel faster than the speed of light. However, he neglects to demolish the universally accepted theory that matter—presumably including flying saucers—traveling at the speed of light would have a mass that is infinite. Using the kind of thinking that is in this book, "Dr. Gee's" flying saucers, traveling on their way to the earth from Venus at greater than the speed of light, ought to be bigger than all of the universes put together, bigger than infinity.

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PSYCHOLOGY

Prevent War by Word War

The Russian people must be told that we are not the aggressor and that we do not want war. Short-wave radio sets must be carried behind the Iron Curtain.

➤ OUR best weapon to prevent war is psychological warfare, Dr. Gustav M. Gilbert, chief psychologist of the Veterans Administration Hospital at Northport, Long Island, told the meeting of the American Psychological Association, State College, Pa.

The Russian people do not want war. Show them that they are not threatened by the United States and they will have no sympathy with a war, Dr. Gilbert said. Dr. Gilbert has made a study of the psychology of dictators as prison psychologist at the Nuremberg trials where he talked daily with Goering and other Nazi leaders.

No dictatorship can withstand the wrath of the people, he stated.

Every dictatorship has rival factions. They are united only by fear and the imprisonment of their own propaganda.

The Germans were horrified at the atrocities committed by their leaders. When they learned, many committed suicide. The Russians would be horrified if they knew that their leaders are committing acts of aggression.

If, at the time of Munich, the German people had been made to see that Hitler was leading them into a disastrous war, he would have been overthrown in a matter of days.

But, so far as those behind the iron curtain are concerned, the United States is the aggressor until they learn otherwise. We should carry short-wave radio sets into territory behind the iron curtain, Dr. Gilbert advised. Just how this is to be accomplished is a problem of strategy, but it should be worked out, he indicated.

Goering foresaw our difficulties with Russia and spoke of it to Dr. Gilbert, he said.

"Just wait five years until Russia has the atomic bomb," said Goering with a smile. "I'll get a great kick out of watching how you handle that situation, looking from heaven or that other place I am going to—the more interesting place."

Dr. Gilbert's speech was in acceptance of the Edward L. Bernays Award of the Society for the Psychological Study of Social Issues, meeting jointly with the American Psychological Association. The Bernays award is a $1,000 U. S. Government bond given annually to the individual or group contributing the best action-related research on the problem of reducing international tensions. It was presented to Dr. Gilbert for his recently published book on THE PSYCHOLOGY OF DICTATORSHIP (Ronald).

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ENTOMOLOGY

Dutch Elm Beetles Becoming DDT-Resistant

➤ BEETLES carrying the dreaded Dutch elm disease have been found to be building up an immunity to DDT and other potent insecticides in Stamford, Conn.

A new strain of the Scolytus bark beetle seems to be following the path of houseflies and mosquitoes that can become DDT-resistant, chief entomologist of the Bartlett Tree Research Laboratories, Dr. Stanley W. Bromley, reported.

This year, in trees saturated with insecticides applied over the residue of previous seasons, more beetles than ever before survived the poisonous sprays. Tests showed also that more and more larvae of the beetles were spending the winter without harm in the bark of elms that had been sprayed with DDT.

Dutch elm disease, introduced to the United States only 20 years ago, is now a major threat to the entire American elm population. At present, high-pressure, high-saturation DDT spraying is one of the mainstays in the battle to keep the disease under control.

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KINGSIPHON—The giant aluminum siphon for ditch and flood type irrigation systems delivers approximately 320 gallons per minute with a 6-inch head. Rated 62% efficient, this siphon is easy to handle as it weighs only 13 pounds.

PSYCHOLOGY

Cats Work, Play with Rats

These two animals, commonly known as "natural enemies", play and work together to get their food. The implications for the world situation are significant.

See Front Cover

➤ FOUR alley cats, straight from New Orlean's French quarter, where they had had practice in dispatching little alley rats, learned to cooperate with laboratory rats.

Cat and rat played together. They worked together. They ate the same brand of dog food from the same plate as shown on this week's cover of SCIENCE NEWS LETTER.

A motion picture of these "natural enemies" in peaceful life with each other was prepared by Tulane University psychologist Dr. Loh Seng Tsai, as a moral to humans. It was previewed before psychologists at the meeting of the American Psychological Association in State College, Pa. Dr. Tsai expects to show it later to delegates to the United Nations.

Dr. Tsai began his experiment with three little kittens, only three weeks old, and three young white rats. He put them all in a cage together where they learned to eat and live together. Then he taught them to work in cooperation. He paired them off—Kitty the cat and Mickey the rat.

Each pair was put into a cage. A wire screen separated them from a tempting dish of food. To get at the food, cat and rat must step simultaneously on two buttons, thus raising the screen.

At first they did not get the idea. Dr. Tsai put food on both keys to give them a clue. But both ate from the same key.

The cat almost caught on. He was playing with the rat's tail and accidentally both keys were pressed, opening the way to the food. So the cat went on playing with the rat's tail, evidently thinking that solved the problem.

But the rat was smarter. He would attract the cat's attention with his tail and when the cat had his paw on his button, he would scurry over and press his own.

Each animal seems to realize that he needs the other's help to get the food, Dr. Tsai reports. One rat got his tail caught going into the test cage and later was reluctant to enter, hesitating in an outer chamber. The cat went back to the entrance and beckoned for his partner to come in and get on the job.

Later Dr. Tsai arranged the experiment so that one animal was held in the outer chamber, but the other animal could release him by pressing a button. Cat and rat both learned to press this button and lift the iron curtain, so that the other could come in and help.

Then the alley cats were brought in and fed with the rats. They, too, made friends and learned to work cooperatively with the laboratory rats.

Dr. Tsai believes that the implications of this experiment for mankind in this world of cold and hot war are obvious. "If the 'natural enemies', cats and rats, can learn to work together, why not unfriendly nations of men?" he asked.

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PSYCHOLOGY

Viki, a Chimp, Talks

➤ A TALKING chimpanzee was introduced to psychologists at the meeting of the American Psychological Association through a sound movie that records her words.

The ape is Viki, three-year-old adopted "daughter" of Dr. Keith J. Hayes, of the Yerkes Laboratory of Primate Biology, Orange Park, Fla., and Mrs. Cathy Hayes. Viki wears dresses, plays like a baby and laughs when she is tickled.

Viki knows three words and can use them correctly. They are the same words that usually form the beginning of a human baby's vocabulary—"mama," "papa" and "cup."

The reason that the ordinary chimpanzee cannot talk, Dr. Hayes concludes from his experience with Viki, is not anything defective in the voice box or other vocal organs. It is not due to lack of intelligence—Viki has the mind of a three-year-old human child, tests show. Instead, the fault is something lacking in the center of the brain that, in man, controls speech.

Dr. Hayes believes that Viki can learn to speak more words, though only with great difficulty. In many ways, she seems like a human who has lost the power of speech because of injury to the speech center of the brain, but can understand much more than she can say.

Viki has lived for all three years of her life in the Hayes' home as their child. In the film she wears a little jumper dress and sits on a table or is carried in the arms of Dr. or Mrs. Hayes.

Her speech started with the ordinary childish babbling during which she learned to make the sounds of all the vowels and a number of consonants. By the end of her third month, she would make such remarks in baby talk as "ah," "wha," "he" and "o."

But after four or five months her babbling stopped. At five months her formal speech training began. First she was taught to "speak" for her bottle, and she learned to bark, much as a dog will when trained.

When she was 14 months old, Dr. Hayes began moving her lips to form the word "mama." In two weeks she learned to say it. At first she could say it only when fingers were on her lips, but later she would put her own hand to her mouth when she made the sounds. Now she always brings her hand to her mouth to call her "mama."

In the following months, Viki began to make a number of sounds in play. One was like a whispered Bronx cheer. Dr. Hayes taught her to put two of these salutes together and to shorten them somewhat. This formed the basis of Viki's second word, "papa." She has learned to address Dr. Hayes with this word, but it is still whispered.

When she was 28 months old, she had learned to put another pair of sounds together to form another whispered word, "cup." This she says when she wants something to drink.

Dr. Hayes has tried to train two other year-old chimpanzees to talk, but without much success. One has learned to give a sort of bark to obtain food, the other can occasionally and with great effort produce a whine.

Science News Letter, September 16, 1950

OBJECTIVE—FOOD—Kitty and Mickey, after some confusion as to how to get the food on the other side of the wire screen, found out that the buttons had to be stepped on simultaneously to raise the screen. Now they work together to satisfy their hunger.

CHEMISTRY

Spearmint Flavor Comes From Peels of Oranges

➤ CHEMISTS have now synthesized a spearmint flavor out of the peels of oranges and grapefruits.

The new product announced to the American Chemical Society meeting by Dr. Carl Bordenca of the Southern Research Institute in Birmingham, Ala., will supplement and partially replace the natural material in chewing gum and other materials.

Natural spearmint oil has been variable in supply and quality in recent years. The new process will utilize a by-product of the citrus canning industry. The chemical synthesized is carvone, which is a compound also present to the extent of 65% in natural spearmint oil.

Dr. Rufus K. Allison and Dr. Philip H. Dirstine, of the same institute, joined Dr. Bordenca in the research.

Science News Letter, September 16, 1950

METEOROLOGY

Russia and U. S. Still Exchange Weather Reports

➤ WEATHER is one of the few things on which Russia and the United States continue to agree. Despite the war in Korea, weather reports from Vladivostok and other stations close to the Korean border continue to be broadcast to the world four times a day.

We reciprocate—and from reports from all over the northern hemisphere both Russian and American weathermen make their forecasts. Sometimes reports, not only from Russian stations but from those controlled by this country, are delayed or do not come through at all.

U.S. Weather Bureau officials report, however, that there has been no deliberate stoppage on the part of the Russians, contradicting a recent Drew Pearson column.

Science News Letter, September 16, 1950

CHEMISTRY

Radioactive Adrenaline Traced through Body

➤ ADRENALINE, gland chemical famous as a lifesaving stimulant in many a dramatic case, has now been made with radioactive carbon from the Atomic Energy Commission's plant at Oak Ridge, Tenn.

Synthesis of the radioactively-tagged compound was reported by Dr. Richard W. Schayer of the Rheumatic Fever Research Institute, Northwestern University Medical School, at the meeting of the American Chemical Society in Chicago, Ill.

Adrenaline is converted into at least five substances in the body, studies with the radioactive form suggest. From his findings so far, Dr. Schayer described the fate of adrenaline injected into the body as follows:

"Adrenaline is removed from the blood by the body tissues, where it is converted into one or more new substances differing in properties from the original adrenaline. The new substances are then released from the tissues back into the blood stream, from which they are picked up by the liver and kidney for possible further change and excretion.

"The identity of the substance or substances found in high concentration in the blood is of interest and will be investigated in later studies," Dr. Schayer stated.

Science News Letter, September 16, 1950

INVENTION

Shower and Dress On the Beach

➤ COMBINATION dressing room and shower bath, a collapsible affair that can be carried to the beach under the arm and set up where wanted, is among inventions on which the government issued a patent recently.

When set up, it is a circular shelter, just big enough to hold one person. It has a base with uprights to support a surrounding curtain, and bucket of water overhead. The bucket is called a sprinkler pail, and has a stopcock to control the flow of water.

This invention is suitable for use by campers and others, the inventor, Franklin B. Brown of Los Angeles, claims. For his work he received patent 2,519,430. Guy ropes and pins may be used to hold the shelter upright during a high wind, he states.

Science News Letter, September 16, 1950

INVENTION

Trim Your Lawn with Used Razor Blades

➤ NOW you can trim your lawn with used razor blades too dull to shave your face. Used blades form the working edge in a grass cutting implement on which a patent was issued by the government recently.

The important part of the implement is an elongated holder to which a series of blades, end to end, are attached. An elevated handle at one end of the holder keeps the hand of the operator safely off the ground. Important is a flat metal shield, with its forward edge open, that fits over and under the blade holder.

When in use the blades project outside this open edge. But at other times the shield is slid in a reverse position over the blade holder where the cutting edge can do no damage to handlers.

This razor-blade grass-cutter brought patent 2,520,464 to Cornelius A. Hubner, Butler, N. J.

Science News Letter, September 16, 1950

IN SCIEN

CONSERVATION

California Forest Fire Danger Is High

➤ CALIFORNIA forestry officials sat on the "most explosive fire season in 26 years" as deer hunters oiled their rifles and prepared to take to the woods on Sept. 16.

Listed by the U. S. Forest Service as the driest state in the union, California has already had more than 4,000 forest and range fires this year. They have claimed six lives and burned more than 200,000 acres, to a total estimated damage of $5,000,000.

Perry A. Thompson, U. S. regional forester, and DeWitt Nelson, state forestry chief, warned that the forest fire danger is now at its peak. Months of dryness have left forests like tinder. Fires can travel a mile in a few minutes under such conditions, they said.

Science News Letter, September 16, 1950

INVENTION

Stainless Steel Given Many Colors by Chemical Process

➤ STAINLESS steel in many colors, for ornamental use and for interior fixtures and furniture, varies from yellow through green and blue to purple when treated chemically in a process which received a patent from the government recently.

This now widely-used, rust-resistant steel alloy is ordinarily of a dull or satin-like appearance if unpolished, but has a mirror-like metallic hue when finished. It can be painted, of course, but paint coatings are usually unsatisfactory because they do not tie in properly with the properties of the steel.

In this process, the colors are obtained by chemical action with the metal surface. The steel is immersed in a bath of water to which a small quantity of phosphoric acid has been added. The acid is by weight from 0.25% to 5% of the solution.

The steel remains in the solution for a period ranging from 20 minutes to 20 hours. A colored, thin, translucent, and usually somewhat iridescent, film forms on the surface. The bath is kept at about the boiling point. Full color is seldom obtained in less than 20 minutes, and appreciable changes in color are obtained up to 20 hours.

Patent 2,521,580 was issued to Regina L. Hornak, Baltimore, Md., and John J. Halbig, Middletown, Ohio, for the process. Rights have been assigned to Armco Steel Corporation, Middletown.

Science News Letter, September 16, 1950

SCIENCE FIELDS

MEDICINE

Exchange Resins May Put End to Salt-Free Diets

➤ CHEMICALS called ion exchange resins may put an end to the monotonous no-salt diet which many patients with dropsy from heart disease and other ailments must now follow.

Good results with these chemicals in both animal experiments and trials on human patients are reported to the American Chemical Society in Chicago by two groups of scientists: Drs. Evan W. McChesney, Frederick C. Nachod and Maurice L. Tainter of the Sterling-Winthrop Research Institute, Rensselaer, N. Y., and Drs. A. E. Heming, T. L. Flanagan and M. F. Sax of Smith, Kline and French Laboratories, Philadelphia.

Dropsy, or edema as doctors term it, is an accumulation of body fluid. It occurs in cases of congestive heart failure, cirrhosis of the liver and some cases of high blood pressure. The fluid accumulates because the body is unable to get rid of enough sodium, such as is contained in common table salt.

Drinking large amounts of water to wash out the salt and at the same time reducing drastically the intake of salt have been measures used to overcome the dropsy.

Using the same principle developed during the last war to remove salt from sea water to make it drinkable, the two groups of scientists have developed special ion exchange resins to remove salt from the patient's body.

In order to avoid robbing the body of potassium as the sodium is being removed, a combination of ammonium and potassium forms of the resin was adopted by Dr. Heming and his associates.

The "cation exchange resins" used to remove salt in dropsy cases should not be confused, Dr. Heming pointed out, with "anion exchange resins" used in treating stomach ulcers. The latter type work by "binding" the acid in the stomach.

Science News Letter, September 16, 1950

PSYCHOLOGY

Quarter Looks Bigger to Rich Child than to Poor

➤ A QUARTER looks bigger to a ten-year-old rich child than it does to a poor child, Drs. Bernard G. Rosenthal and Janice Houghton Levi of the University of Chicago told the meeting of the American Psychological Association in State College, Pa.

This is true also of other coins—a penny, a nickel, a dime and a half dollar. It is the same whether he has the coin on hand or whether he is making the judgment from memory.

The ten-year-olds tested by the psychologists made their judgment by adjusting the size of a circle of light on the screen of a box until it matched his idea of the size of the coin.

Rich children as compared to the poor showed a greater tendency to say that they would spend money on themselves rather than on others. And more rich children said that they would rather save their money than spend it.

Science News Letter, September 16, 1950

METEOROLOGY

Weather Flashes On Broadway

➤ WEATHER matters less on Broadway than most places. Nevertheless the newest Great White Way sign advertising a life insurance company translates the official forecast into steady green for sunshine ahead, steady orange for clouds expected, flashing orange for rain and flashing white for snow. Future temperature changes are shown by jumps in bands of light.

Science News Letter, September 16, 1950

CHEMISTRY

Tartaric Acid From Coal Product

➤ BAKING powder can now be made from wholly American materials, thanks to the commercial synthesis of tartaric acid. This ingredient has previously been made from deposits that form during the aging of French wine.

Prof. James M. Church of Columbia University's chemical engineering department told the American Chemical Society in Chicago that tartaric acid should soon be made as cheaply from benzol, a coal-tar product, and hydrogen peroxide, as it can be recovered as a by-product of the European wine industry.

Chemical manufacture of tartaric acid was stimulated by the shortage of tartrates and the high prices of the wine industry product that followed World War II. Obtaining natural tartaric acid as a wine by-product is a slow and complicated process, involving much labor and handling of materials in southern France. Users of the chemical in the United States were affected by the fluctuations of the wine industry and tariff regulations.

Chemical manufacture of tartaric acid begins with a similar chemical structure, maleic anhydride, which is made from coal-tar benzol. Combined with hydrogen peroxide in the presence of a little tungsten oxide as catalyst, a water solution of the maleic anhydride gives a pure tartaric acid that can be crystallized out simply.

Science News Letter, September 16, 1950

CHEMISTRY

Antibiotics May Fight Fungi and Insects

➤ INSECTS and fungi in the future may be fought with the same kind of materials, antibiotics, that are saving human lives by the thousands from a whole array of infectious diseases.

A new antibiotic with high potency as a fungicide was reported to the American Chemical Society by Dr. John Little of the Vermont Agricultural Experiment Station, Burlington, Vt. Isolated from the roots of a tropical flowering plant, *plumeria multiflora*, it is called plumericin.

Chemists are searching for new chemical fighters of disease in all sorts of growing substances. The prime hope is that new antibiotics will prove more effective against diseases already combatted by penicillin, streptomycin, aureomycin, etc., or against ills untouched by them.

Some of the new substances prove too toxic to human beings to be used medically and these, if they can be made cheaply enough, may prove useful in the war against insects, mildew, molds and other pests that affect the things man uses instead of his health.

Another antibiotic, netropsin, obtained from the same family of organisms that produces streptomycin and terramycin, was reported by Chas. Pfizer and Co. chemists as a promising weapon against clothes moths and carpet beetles.

Science News Letter, September 16, 1950

MEDICINE

Ultrasound, Unheard, Hits Nervous Tissues

➤ ULTRASOUND, which cannot be heard by human ears, affects nerves more than any other tissue of the body, Dr. Warren A. Bennett of the Mayo Foundation, Rochester, Minn., reported in Boston to the American Congress of Physical Medicine.

The findings came from studies in which dogs with spontaneously occurring tumors were treated with ultrasound. Scientists at the Mayo Clinic and Foundation are trying to learn whether ultrasound waves can disintegrate cancers and other tumors and whether the way in which these high frequency sound waves are reflected can be used to detect cancers.

"The destruction due to ultrasound," Dr. Bennett reported from his experience in treating dogs, "depends on the duration and intensity of treatment along the type of tissue through which the sound passes. The lack of destructive selectivity has led to the destruction of normal tissues as well as the tumor. Marked changes appear to be irreversible."

Science News Letter, September 16, 1950

ENGINEERING

U. S. Pumps Oil for Korea

Oil production has been upped to meet the demands of the Korean war effort. Military demand during peace is only four to five per cent of the total domestic demand.

By WADSWORTH LIKELY

➤ SO far as petroleum is concerned, this country is well set for a war, partial or all-out. But a war will bring much nearer the day when we must use great quantities of liquid fuels from coal and oil shale and synthetic gasoline from natural gas.

Right now runs of crude oil through the refineries are moving up to 5,800,000 barrels a day and may go up 400,000 more barrels a day before the end of the year. Domestic petroleum production from the wells is almost up to the all-time high average set in 1948 of 5,520,000 barrels a day.

Production has been down during the past two years. During the first quarter of 1950 it was held down to 5,000,000 barrels a day, but the levels have been brought up because of the Korean crisis.

During the five years of so-called peace, the military demand has been four to five per cent of the total domestic demand. This, naturally, will be stepped up. But the step-up, in some case, may be disguised because certain factories which use petroleum may be taken off civilian work and put on defense work. Ships, too, using fuel for civilian freight, will be shifted over to carrying troops and supplies, with little real increase in the demand for petroleum in that category.

If our Air Force is greatly increased, the demand for aviation fuel will jump. In 1940, as an example, we manufactured 15,000,000 barrels of aviation gasoline a year. In the peak war year, 1944, we produced 200,000,000 barrels.

Civilians felt this huge jump in gasoline rationing. We cut automobile consumption of gasoline 35 to 40 per cent. Last year, we used 772,000,000 barrels of gasoline on the nation's highways.

More Gas for Pilots

Immediate jumps in demands for aviation fuels will be felt if we start a new pilot training program. Bombing and strafing trips from Japan to Korea have not cost so much in fuel as did the thousand-plane raids from England into the heart of Germany.

So far, the west coast has been most affected petroleum-wise. There has been a stepping up in California operations, and no longer is that oil-rich state considered to have an oil surplus above ground. Shipping of petroleum and petroleum products from California around to the east coast is being stopped.

The demands for petroleum in a partial or an all-out war depend, of course, on the kind of war it is. In World War II, we sent millions of men overseas and tons of supplies, both for our men and for our allies. This meant a big increase in the demand for ship fuels and aviation gasoline for air transports.

Once in Europe, we depended largely on trucks and planes to move our troops and supplies. World War II was costly so far as petroleum was concerned.

Lavish Gas Use in War

The United States used petroleum quite lavishly. Troops burned gasoline from motor pools to make heat for washing "appropriated" clothes and cooking food. Economical feeding of gasoline to plane motors was merely a technique to increase the range of our fighter craft, not to save precious fuel.

Man for man we used many more gallons of gasoline and oil than did our allies. Our enemies were even worse off. Vital progress was made in synthetic fuels in Germany because of the unavailability of the real stuff.

Prime reason for the early Japanese drive southward into Indonesia was the supply of oil there. And a prime reason for the Japanese defeat was that our submarines and planes and surface ships succeeded in virtually cutting off the Japanese homeland from those oil supplies.

Today, in addition to sending fuels directly from the west coast, we may well be purchasing Indonesian production for our troops and planes in the Far East.

Demand for petroleum and its products has risen prodigiously in this country. The end of World War II brought no appreciable decrease in this demand, as our factories got into high gear for the greatest civilian production in our history and as more cars got onto the roads than ever before.

In 1940, domestic demand for petroleum was a little over one and a third billion barrels; in 1948, two and one-tenth billions. In 1944, presumably the peak war year for petroleum, we demanded and got almost one and seven-tenths billion barrels.

No one knows just what percentage of this demand can be attributed to our military needs. Figures are still not very complete and, in addition, it is sometimes hard in wartime to say what is military and what is civilian.

More Drastic Rationing

If there is another all-out war, and if it does entail the carrying of large numbers of troops and tons of supplies overseas plus a large air effort, we may expect a more drastic curtailment of purely civilian use of gasoline and oil. In addition, the military may be expected to use what petroleum it is given more economically.

Current proved reserves—the petroleum we know is under our ground—is about 28,000,000,000 barrels, the highest in our history. We continue to find more every year—both underground and under the

OIL SEARCH—ON THE LAND, IN THE AIR—Land searchers for oil, drill truck and water truck men, prepare to drill a shot-hole for dynamite while in the air a helicopter equipped with a magnetometer measures variations in magnetism, thus gaining clues to the presence of oil-bearing formations

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waters around our shores.

In addition there are hundreds of billions of barrels hidden in oil and tar shale, waiting on their need and on more economical methods of getting them out. Progress has been made in extracting liquid fuels from coal. And every year millions of dollars are being spent on research in synthetic fuels.

Farther in the future is the use of atomic power to propel our ships and planes. Research is being done now on the possibilities of providing a submarine with an atomic motor.

Although even a new all-out war may not make necessary our dependence on these new sources of petroleum, these new methods of mobile power, it will bring much closer the day when we will have to produce them and use them in peacetime. There is only so much oil under the ground.

Science News Letter, September 16, 1950

MEDICINE

Med Schools Alerted On A-Bomb Courses

➤ A STRONG hint to the nation's medical schools to consider atomic explosions and other military medical matters promptly if they have not already done so appears in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Sept. 9).

The hint comes in the Association's fiftieth annual report on medical education in the United States and Canada. The report was written late in August. At that time, "it was not possible to forecast the impact of the United Nation's police action in Korea on medical education in the United States."

But, the report goes on to state, "it does seem clear that without further delay medical schools will want to review their curricula to determine how increased emphasis can appropriately be placed on such subjects as military medicine, public health and civilian emergency relief, including the prevention and treatment of casualties from atomic explosions.

"Planning for the dispersal and evacuation of medical schools in the event of bombing of American cities is another topic to which the medical schools will undoubtedly address themselves in the months ahead."

More than 7,000 students are expected to enter medical schools as freshmen this fall. Last year's freshmen class was 7,042, an increase of 5.3% over the preceding year and an increase of 17% over the average size of the freshmen class in the 10 years preceding World War II.

Medical schools also now have fewer vacancies in the teaching staffs.

Minimum cost to students of attending medical school for one school year, including tuition, other fees, books, equipment, essential living and travel expenses, ranges from $567 to $2,252.

Fees charged the student for tuition will average $554 during the year 1950-1951. But the students' fees will provide less than one-fourth of the budgets of the medical schools, which for the current year total about $67,500,000.

These budgets have increased by 42% over the last four years. While a number of schools still are having difficult financial problems, the American Medical Association finds that schools have a record of improved support.

Science News Letter, September 16, 1950

PSYCHOLOGY

Thirties Best Years For Creative Work

➤ INCREASING the average length of life will result in a greater creative output on the part of our geniuses. But the most fruitful years of creative work will still be those between 30 and 39.

This is the conclusion of Dr. Harvey C. Lehman, of Ohio University, based on a study of the contributions of large numbers of creative thinkers. His results were reported to the American Psychological Association.

Those who live to be 85 years old and those who die at 50 both do their best work in their thirties, Dr. Lehman told the meeting. But with greater longevity, the average output is somewhat greater, the average age at time of achievement is greater, and a smaller proportion of total production occurs during the best years.

Science News Letter, September 16, 1950

PSYCHOLOGY

Twice-as-Fast Speech Found Intelligible

➤ IT is possible to understand speech at a rate twice as fast as it is ordinarily spoken, the American Psychological Association learned in State College, Pa., from a report by Dr. Richard H. Henneman of the University of Virginia.

Telephone conversations can be shortened and transmission time saved by transmitting a canned, condensed version of the speech, Dr. Henneman reported. In an experiment, a magnetic tape recording was made of separate words and of a sentence intelligibility test. Then by cutting and splicing the tape, various speed-ups were obtained.

For continuous speech the intelligibility did not drop appreciably until the speed was more than double. When the intact tape was run faster so that the frequency, or pitch of the voice was changed, intelligibility dropped to 65% at double the speed.

Science News Letter, September 16, 1950

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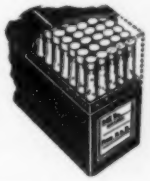

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MEDICINE

New Cortisone Synthesis

➤ AN IMPROVED method of synthesizing cortisone, which promises to increase the supply of the now scarce arthritis remedy, was announced by Dr. E. C. Kendall and four Mayo Clinic co-workers at the meeting in Chicago of the American Chemical Society.

The nation's seven million or so arthritis sufferers probably never have heard of osmium. This is a very hard, gray metal which gets its name from the strong odor of one of its oxides. But the smelly hard metal in one of its forms, osmium tetroxide, has heretofore been necessary for the synthesis of cortisone.

Now Dr. Kendall and associates have found a way of making cortisone from bile acids without using osmium tetroxide.

"Cortisone may be made more cheaply and abundantly as a result," he declared.

Currently, he explained, "such large quantities of osmium are required and the supply is so limited that all pharmaceutical companies which would like to manufacture cortisone cannot secure the necessary amount of this rare element."

Osmium is not only expensive and rare but also toxic, so one part of the synthesis now followed required the recovery of all traces of osmium used in making cortisone.

Key to the preparation of cortisone is the introduction of what chemists call a hydroxyl group into the proper molecular position. It must be attached to the seventeenth carbon atom in a compound known as a pregnane derivative, which is extracted from cattle bile.

The new synthesis was accomplished by following precise chemical preparations of a series of intermediate compounds. The steps had to be delicately timed so that it was possible, through skillful manipulation, to remove the hydroxyl groups that entered the wrong positions, without removing the desired group. The success of this method is the culmination of four years of research work at the Mayo Foundation.

"The results could not be predicted," Dr. Kendall stated. "The achievement is a source of much satisfaction.

"The discovery of this series of intermediate compounds may be of no little significance in the large-scale production of cortisone. The sequence of steps can be applied to starting material other than that used in the work described in this paper and the ability to introduce a hydroxyl group at C-17 in derivatives of pregnane without the use of osmium tetroxide may remove a formidable block in the commercial production of cortisone."

Associated with Dr. Kendall in this work were Drs. Frank B. Colton, William R. Nes, David Van Dorp and Harold L. Mason.

Cortisone made without osmium has been produced in a radioactive form so that more can be learned about the path this drug takes through the body and, perhaps, how it acts to relieve arthritis and other ailments.

This feat was announced by Drs. T. F. Gallagher, Theodore H. Kritchevsky, David Fukushima, Bernard Koechlin and Max Eidinoff of Sloan-Kettering Institute and Memorial Hospital, New York.

Radioactive tritium was substituted for hydrogen in one stage of the synthesis to produce the radioactive cortisone.

Four other adrenal cortex hormones were also prepared and were made also with the stable isotope of hydrogen, deuterium, in the molecule. These hormones are also expected to aid in the study of the part these hormones play in fighting disease.

Science News Letter, September 16, 1950

NUCLEAR PHYSICS-GENETICS

Atom Alters Heredity

➤ DEFINITE proof that the atom bomb can alter plant heredity—and hence also the genetic legacy handed down by human atomic victims—has come from tiny seeds of cotton, barley and wheat brought back from Bikini.

Results of four years of experiments with seeds exposed to the atom bomb on the decks of the Bikini target fleet have been published in the JOURNAL OF HEREDITY (May) by scientists at Texas A. & M. College and the State College of Washington.

"From the standpoint of human welfare, proof that ionizing radiation released through the explosion of an atomic bomb can cause breaks in plant chromosomes means that human and animal chromosomes, as well as all others, are also liable to the same kind of injury," Dr. Meta S. Brown, Texas A. & M. specialist in genetics and the biology of individual cells, writes.

The Texas research showed that cotton grown from Bikini-radiated seeds had irregularities in the vital pairing of its chromosomes which could be attributed only to the atomic radiation.

From Pullman, Wash., Dr. Luther Smith reported similar changes in barley, wheat and oats. Both experiments were conducted as part of a long-term investigation by the Navy and the Agriculture Department into the biological effects of the A-bomb.

The cereals, Dr. Smith pointed out, had received the equivalent of 16,000 units of X-ray radiation, which is far more than a human being can take and still live.

Nevertheless, said the Texas report on cotton, "there is the possibility of hidden changes in chromosome structure which constitute a potential threat to the fertility of the individual (human being)."

"It has been repeatedly demonstrated that translocations and other structural changes in chromosomes have an adverse effect on the fertility of plants and animals," Dr. Brown reported.

Experiments such as these undoubtedly were the scientific backing for a warning on possible genetic changes published recently by the Atomic Energy Commission and Department of Defense in its handbook, THE EFFECTS OF ATOMIC WEAPONS.

"There is a large body of data which indicates that any dose of radiation, no matter how small, increases the probability of genetic changes," the AEC handbook said. To lessen the risk of passing on changes in chromosome structure, it advised atomic victims to "refrain from begetting offspring for a period of two or three months following exposure."

Science News Letter, September 16, 1950

MEDICINE

ACTH Saves Burned Man

➤ ONE of the wonder drugs relieving arthritis, ACTH, promises to become a lifesaver for badly burned soldiers and civilians who otherwise would die.

The American Chemical Society, discussing the chemical structure of this drug extracted from pituitary glands, heard of a case in Phoenix, Ariz., of a man badly third-degree-burned in an oil fire who was given ACTH with complete recovery after skin grafts. Without ACTH the man would have undoubtedly died, but the anti-arthritis drug prevented fluid loss, toxemia and muscle damage usual in such severe burns.

Armed service experts heard of the case, which was handled by Dr. Maurice J. Whitelaw, and observed it. As a consequence those handling ACTH production expect that it will be used medically at the fighting front. This may even slow down the application of the drug for treating arthritis and other diseases among civilians.

One of the newer uses of ACTH has been to combat acute alcoholism.

Dr. D. F. Waugh of the Massachusetts Institute of Technology reported to the chemists that the weight of the ACTH molecule was much smaller than previously supposed, between 1,000 and 1,300, that is, 1,000 to 1,300 times the weight of the hydrogen atom. This means that structure of ACTH is considerably simpler than

supposed previously, containing only a half a dozen different amino acids as building blocks. This gives the chemists new hope that eventually they will be able to manufacture ACTH artificially rather than obtain it from the pituitary glands of hogs which are in short supply.

Science News Letter, September 16, 1950

MEDICINE

Cortisone, ACTH Shield Against Arthritis

➤ CORTISONE and ACTH act as shields against the fire of whatever it is that causes rheumatoid arthritis. But they "do not put out the fire nor act as carpenters to repair the fire's damage," Dr. Howard F. Polley of the Mayo Clinic, Rochester, Minn., declared at the American Congress of Physical Medicine in Boston, Mass.

For repairing the damage of deformed joints and wasted muscles, doctors who specialize in physical medicine, called physiatrists, are still needed.

"The means by which cortisone and ACTH produce their anti-rheumatic effect is not yet known," Dr. Polley said.

"They do not kill germs. Neither do they 'cure' diseases the symptoms of which they may so profoundly modify. But in some unknown manner they provide susceptible tissues with a shield against a wide variety of irritants."

When stiffness of joints and pain are relieved, patients can be further helped by exercise, heat, hydrotherapy and other kinds of physical therapy. Physical medicine can also help patients who cannot be given enough cortisone or ACTH to control the arthritis completely.

Dr. Polley warned, however, that joints which have long been inactive or crippled should not be rehabilitated too fast or strenuously. Sudden increase of activity can cause broken bones. Exercises should be started gradually and carefully, even when relief from pain makes the patient ready to try anything.

Science News Letter, September 16, 1950

MEDICINE

Cortisone Cost Cut to One-Fourth Former Price

➤ PATIENTS getting cortisone for rheumatoid arthritis and other conditions now will pay only one-fourth the price they had to pay one year ago when it first became available for clinical research.

Merck and Co., manufacturers of cortisone under the trade name of cortone, announced that the price to hospitals will be $50 per gram. In August, 1949, the price was $200 per gram. This price cut, the fifth in the past year, results from improvements in production which have significantly increased the yield of the chemical as well as reduced production costs.

Good supplies of cortone are now available to 6,500 hospitals which meet certain requirements. At present the drug is to be used in the beginning stages of treatment only in patients treated in these institutions. After the initial treatment, however, the doctor may give continued treatment in his office or the patient's home.

The amount of cortisone given a patient varies, so it is difficult to state exactly what the new price will mean to an individual patient. After a higher dosage at the start, the patient may be put on one-tenth of a gram per day or even every other day. The cost to hospitals for maintenance dosage is figured at $2.50 to $5 per day.

More than 3,000 patients with rheumatoid arthritis have now been treated with this drug, with a prompt let-up of all signs and symptoms of the disease in practically every case. In addition, the hormone chemical has been used to bring striking improvement in acute rheumatic fever, bronchial asthma, early stages of disseminated *lupus erythematosus,* Addison's disease, inflammatory eye diseases, and many skin disorders including pemphigus, angioneurotic edema, atopic dermatitis and exfoliative dermatitis and cases of skin trouble due to drug reactions.

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PSYCHOLOGY

"Democracy" in New York Times, Pravda Means Same

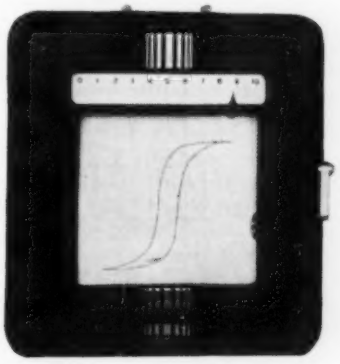
➤ BELIEVE it or not, the word democracy does mean the same when used by Stalin as it does in the writings of Lincoln.

A study of the context in which the word was used in Russian writings of Marx, Lenin, and Stalin as well as in Pravda, New Times and the Cominform Journal was reported in State College, Pa., to the American Psychological Association by Dr. Ralph K. White, Washington, D.C., psychologist. He compared the meaning of democracy in the Russian texts with the same word as used by Jefferson, Lincoln, Roosevelt and in the New York Times, Life, and the Chicago Tribune.

The Soviet definition of democracy is not radically different, on the ideological level, from our own, Dr. White found. The difference is mainly in emphasis.

The idea that the Russians stress government "for the people" and not "by the people," is mistaken, Dr. White said. They stress both. What they do not stress is individual freedom—even on the ideological level.

Science News Letter, September 16, 1950



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WILDLIFE

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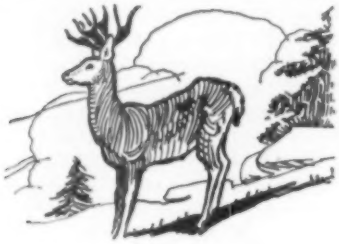

Deer

➤ FROM earliest colonial days deer have been regarded by Americans with more affection than almost any other form of wildlife. Not only poets but the hunters who sought deer have praised their delicate beauty, quiet dignity and grace of movement.

When the white men first came to this country, the forests east of the Mississippi were full of one of the finest of all the species, the white-tailed or Virginia deer. This family is still the most widely-distributed, though it is outnumbered in certain areas by the black-tailed or mule deer.

The Indians were dependent upon deer. Deer gave the red man venison and pemmican for food, hides for warmth on winter nights, buckskin for clothing and antler-points for tools and ornaments. In their turn, the white men who pushed beyond the settlements became quite as dependent upon the deer as the Indian tribes who fought the Europeans' coming. French trader and English pathfinder were alike in this: Boone and Joliet both traveled in buckskins and moccasins.

The white-tailed deer led a hard life, stalked not only by men but by predatory animals such as wolves and panthers. Yet they held their own against them all.

But the long-barreled guns of the whites dispossessed the Indians and all but wiped out many forms of wildlife. It took a terrible toll of deer. The ax and the plow swept away the native wilderness and destroyed the deer's natural home over vast stretches of territory. Men saw no good in forests when the land could be used for farming. The destruction perhaps was inevitable; pioneering was rough work, and the settlers needed both land and meat.

The low point in the continent's deer population came and went with the turn of the twentieth century. By that time the reckless hunting by Americans, without thought of the consequence, was coming to an end. They began to make amends for past wrongs. Rigid hunting seasons were enforced, with strict limits on numbers of deer which could be taken.

Predatory animals had been all but pushed into extinction. And the westward course of agriculture helped the deer to return. Abandoned farms, particularly in New England, returned to a semblance of the wilderness they once were. As the brush and trees came back, so did the deer.

Today, sportsmen see what their fathers thought would be forever impossible: a growing number of deer, so many of them in states such as Pennsylvania that open seasons are occasionally possible—and also complaints by farmers, descendants of the bloody-handed pioneers, that deer are ruining their crops. The meek are inheriting the earth.

Science News Letter, September 16, 1950

PLANT PATHOLOGY

Fight for Lives of Elms

➤ SCIENCE'S battle to save the American elm is largely centered in the work of a famed research station on an elm-shaded residential hill in New Haven, Conn.

This month the Connecticut Agricultural Experiment Station, oldest in America, will celebrate its 75th birthday. Then it will go right back to its search for better ways to stop the deadly advance of Dutch elm disease and phloem necrosis, two diseases which threaten the entire elm species in America with extermination.

Both diseases are spread by insects. The elm-bark beetle leapfrogs from tree to tree with the fungus of Dutch elm disease on its body. A leafhopper carries phloem necrosis. The seriousness of the elm's plight was underscored by the U. S. Department of Agriculture recently in the announcement that Dutch elm disease, introduced to this country in 1930, has now spread from New England as far west as Colorado and as far south as Virginia.

To fight the insect "vectors" carrying the twin blights, high pressure, high dosage DDT sprays are used. When the blast of chemical mist is enough to completely soak the foliage of a tree, the job of protection is about 40% done, Connecticut plant scientists have learned.

The other string in the bow of elm rescue is chemical treatment of the roots. This chemotherapy is aimed at controlling the fungus of Dutch elm disease. It has proved one of the most promising approaches to date. Applied with an injection nozzle under pressure, chemicals such as 8-quinolinol benzoate have in many cases protected healthy trees from infection. But even such drastic treatment will not usually cure a tree already sick.

Neither chemotherapy nor DDT gives an absolute answer to Dutch elm disease. No tree stricken with phloem necrosis has been known to recover. One hope for the future are strains of disease-resistant elms being studied by the U.S.D.A.

But worried scientists are concentrating on ways to save the present generation of elms, knowing that a new generation of hardier elms may come too late.

Science News Letter, September 16, 1950

METALLURGY

Americium Is Light

➤ A HEAVY metal that is much lighter than expected has come to light with the metallic isolation of the universe's 95th element, americium, announced in Chicago, Ill., to the American Chemical Society by Dr. Edgar F. Westrum of the University of Michigan.

Plutonium, the modern A-bomb element, is number 94 and heaviest substance among the 98 elements known. Americium, just obtained in its silvery metallic form, has only about half its parent's density.

This means that even though americium's atomic weight is greater than that of plutonium, two bricks of americium would be necessary to counterbalance one of equal size made of plutonium. This is because inner forces give the americium atom a more expanded structure.

At least five new chemical elements beyond californium, number 98, will be discovered in the future, Dr. Glenn T. Seaborg, University of California chemist and plutonium's discoverer, predicted in an interview in Chicago.

He is able to predict the chemical properties of the rest of what is called the actinide series, which ends with the element 103 whose atomic weight will be 267. Elements beyond 95 may be lighter than plutonium and uranium, if the tendency toward lower density shown by americium continues.

Only 5,000 atoms of the most recently discovered element, californium, existed, Dr. Seaborg said, and future new elements manufactured out of transuranium elements will be even rarer.

It is not known whether this process of synthetic building of elements duplicates ancient elements, long extinct, that once existed on earth or whether man has now gone nature one better and made material that has hitherto been impossible.

Science News Letter, September 16, 1950

Books of the Week

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ANNUAL REPORT 1949—*National Mental Health Foundation*, 24 p., paper, free upon request to publisher, 1520 Race St., Phila. 2, Pa.

BEHIND THE FLYING SAUCERS—Frank Scully—*Holt*, 230 p., $2.75. A supposedly serious argument in favor of the existence of flying saucers. (See SNL, Sept. 16, p. 181.)

BOTANY: An Evolutionary Approach—R. Darnley Gibbs—*Blakiston*, 554 p., illus., $6.00. An introductory college text.

CATS—Wilfrid S. Bronson—*Harcourt, Brace*, approx. 77 p., illus., $2.00. The characteristics of the many types of cats are described and explained. Delightfully illustrated.

CHANCE AND CHOICE BY CARDPACK AND CHESSBOARD, Vol. I: An Introduction to Probability in Practice by Visual Aids—Lancelot Hogben *Chanticleer*, 417 p., illus., $12.50. A college text to be used in a course in statistical theory. Well illustrated.

THE CHORDATES—Herbert W. Rand—*Blakiston*, 862 p., illus., $6.00. A general text on animals with backbones.

DAIRY CATTLE AND MILK PRODUCTION—Clarence H. Eckles—*Macmillan*, 4th ed., 560 p., illus., $5.00. A general text revised by Ernest L. Anthony, a former student of the author.

ELEMENTARY TEACHERS GUIDE TO FREE CURRICULUM MATERIALS—John Guy Fowlkes, Ann Meyers and Paul T. Cody—*Educators Progress Service*, 7th ed., 343 p., paper, $4.50. An up-to-date, annotated list of free maps, bulletins, atlases, pamphlets, exhibits, charts and books.

FATHER OF RADIO: The Autobiography of Lee de Forest—*Wilcox and Follett*, 502 p., illus., $5.00.

FREUD: DICTIONARY OF PSYCHOANALYSIS—Nandor Fodor and Frank Gaynor, Eds.—*Philosophical Library*, 208 p., $3.75. A glossary of the basic terms in psychoanalysis as defined by Sigmund Freud.

THE HUMAN USE OF HUMAN BEINGS: Cybernetics and Society—Norbert Wiener—*Houghton Mifflin*, 241 p., $3.00. Dr. Wiener applies his theory of cybernetics, that is communication and control in the man and the machine, to our daily lives.

INTRODUCTION TO TEXTILE CHEMISTRY—Bruce E. Hartsuch—*Wiley*, 413 p., illus., $4.75. A college textbook.

AN INTRODUCTION TO THE EMBRYOLOGY OF ANGIOSPERMS—P. Maheshwari—*McGraw-Hill*, 453 p., illus., $6.00. A study of the seed plants in their embryonic stages.

LINEAR INTEGRAL EQUATIONS—William Vernon Lovitt—*Dover*, 253 p., illus., $3.50. The general theory of linear integral equations with some of the applications.

MACHINE SHOP METHODS—Lorus J. Milne—*Prentice-Hall*, 376 p., illus., $5.00. Basic principles and methods of shop tools and machines.

MAN THE MAKER: A History of Technology and Engineering—R. J. Forbes—*Schuman*, 355 p., illus., $4.00. This is the 15th volume in Schuman's Life of Science Library.

METALS AT HIGH TEMPERATURES—Frances Hurd Clark—*Reinhold*, 372 p., illus., $7.00. A reference manual on the properties of metals at elevated temperatures.

MID-CENTURY: The Social Implications of Scientific Progress—John Ely Burchard, Ed.—*Technology Press of The Massachusetts Institute of Technology* and *Wiley*, 549 p., $7.50. Verbatim account of the discussions held at MIT on the occasion of its Mid-Century Convocation March 31, April 1-2, 1949.

THE NEUROLOGIST'S POINT OF VIEW: Essays on Psychiatric and Other Subjects—I. S. Wechsler—*Wyn*, rev. ed., 261 p., $3.00. A neurologist discusses many of the problems of mankind today.

PHYSICAL CHEMISTRY—Walter J. Moore—*Prentice-Hall*, 592 p., illus., $6.65. An introductory college text.

THE RUBBER-BALL GAMES OF THE AMERICAS—Theodore Stern—*Augustin*, 122 p., illus., $2.50. A monograph on the beginnings of the rubber ball games in the Western Hemisphere.

SECRET—Michael Amrine—*Houghton Mifflin*, 311 p., $3.00. The story of one man's adventures in helping to make the atomic age. Fiction, of course.

SOIL FERTILITY AND SEWAGE—J. P. J. Van Vuren—*Dover*, 236 p., illus., $4.50. A report of the author's work in South Africa.

STERILIZATION IN NORTH CAROLINA: A Sociological and Psychological Study—Moya Woodside—*University of North Carolina Press*, 219 p., $2.50. An account of one state's experiment in eugenic sterilization.

SURVEY OF FOOD AND NUTRITION RESEARCH IN THE UNITED STATES 1948-1949—Food and Nutrition Board of the National Research Council—*U. S. Dept. of Commerce*, 311 p., paper, $1.75.

TEXTBOOK OF ABNORMAL PSYCHOLOGY—Roy M. Dorcus and G. Wilson Shaffer—*Williams & Wilkins*, 4th ed., 717 p., illus., $5.00. A college textbook brought up-to-date.

THREE TO SIX: Your Child Starts to School—James L. Hymes, Jr.—*Public Affairs Committee*, 32 p., illus., paper, 20 cents. A brief discussion of the many problems parents have in sending a child to school for the first time.

YOU CAN STOP DRINKING—Harold M. Sherman—*Creative Age Press*, 245 p., $2.49. A few hints on how to control excessive drinking.

YOUNG AT ANY AGE—*New York State Joint Legislative Committee on Problems of the Aging*, 192 p., illus., paper, free upon request to Sen. T. C. Desmond, 94 Broadway, Newburgh, N. Y. This report places particular emphasis on charting a blueprint for state action in dealing with our aging citizens.

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WINDSHIELD PROTECTOR, for use at drive-in movies, is a visor-like attachment to keep rain and snow off the windshield and promote good vision. It is a flexible plastic material, easily and quickly attached, that is held in place by a framework extending under the car's door.

Science News Letter, September 16, 1950

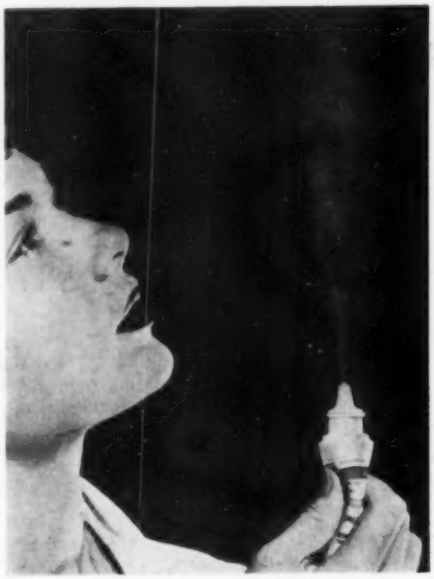
COFFEE TABLES with tops that resemble marble are made of a plastic known as melamine formaldehyde resin which will not chip, peel, or mar from cigarette burns or alcohol. They come in round, square or rectangular shapes, and a choice of colorings.

Science News Letter, September 16, 1950

FLOOR FINISH for gymnasiums, handball courts and other recreational rooms is a plastic product utilizing cellulose. Several coats are applied, the first of which penetrates the wood to make a perfect bond. The finish is transparent and does not change the color of the floor.

Science News Letter, September 16, 1950

HAY FEVER ATOMIZER, when squeezed, produces an extremely fine mist as shown in the picture. It is an antihistamine dispenser, made of polyethylene, which is used to shoot the hay fever drug anahist



into the nostrils and to the nasal membranes. A screw-on cap makes it safe against leakage in the handbag.

Science News Letter, September 16, 1950

TRAILER SWEEPER, a three-wheeled affair to tow behind a car or truck to clean streets and airport runways, is powered with a 15 horsepower engine and has revolving brushes from six to nine feet in length. It is built for one-man operation, and is sturdy enough for removing snow.

Science News Letter, September 16, 1950

TIRE ALARM, attached to the tire like an ordinary valve cap, whistles a loud alarm when the pressure within the tire gets below the amount needed for safe driving. It adds another safety factor as well. Being luminous, it shows at night as a revolving circle of light.

Science News Letter, September 16, 1950

ELECTRIC BULB, battery-operated and designed to replace the many thousands of oil lamps used at railroad switches, has inside frosting that diffuses light to lantern-flame size. A new-type non-rechargeable battery, developed to use with the bulb, operates 10 months continuously.

Science News Letter, September 16, 1950

COOLER for liquids in a pitcher is a cylindrical watertight ice receptacle which stands upright in the liquid. The metal walls of the ice container in this recently patented device permit rapid cooling of the surrounding liquid.

Science News Letter, September 16, 1950

Do You Know?

The *shot* load from a gun, traveling at a rate of 950 miles an hour as it leaves the muzzle, slows to about a 650-mile rate at 20 yards.

The Lapps of northern Norway have a three-year-old organization in the interest of preserving and fostering the unique *Lapp culture.*

The use of soap per person in the United States was 15% less in 1949 than the previous year, but the use of synthetic *detergents* greatly increased.

Lampreys are eel-like primitive fish with well-developed sucking mouths; some are parasitic and attach themselves to fish and obtain nourishment from the body of their host.

Unleached wood *ashes* may contain from 5% to 7% potash and 1% to 2% phosphoric acid and therefore are a valuable fertilizer; ashes that have been leached by rain have much less value.

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